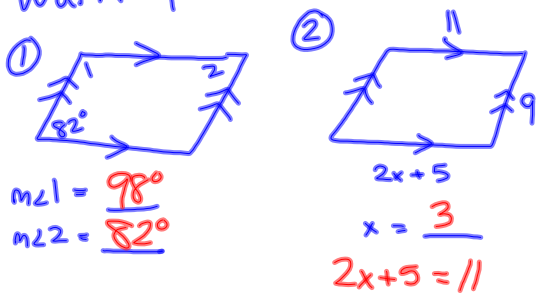
Warm Up



m∠1 = 98°

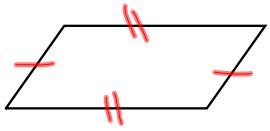
m∠2 = 82°

x = 3

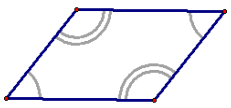
2x+5 = 11

8.3 Tests for Parallelograms

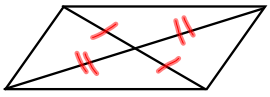
Theorem 8.9 If both pairs of opposite sides are congruent, then the quadrilateral is a parallelogram.



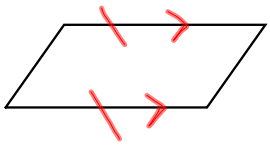
Theorem 8.10 If both pairs of opposite angles are congruent, then the quadrilateral is a parallelogram.



Theorem 8.11 If the diagonals bisect each other, then the quadrilateral is a parallelogram.

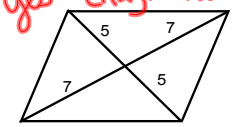


Theorem 8.12 If one pair of opposite sides is both congruent and parallel, then the quadrilateral is a parallelogram.

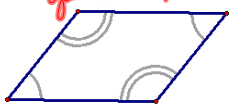


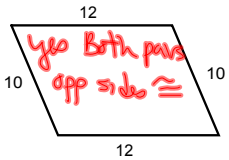
Are the following parallelograms? Why?

yes diag. bis. each other



yes Both pairs opp ∠s ≅





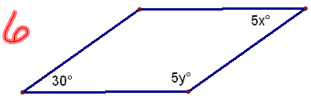
yes Both pairs opp sides ≅

No

Find x and y so that the quad. is a parallelogram.

$5x = 30$

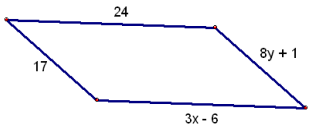
$x = 6$



$5y = 150$

$y = 30$

Find x and y so that the quad. is a parallelogram.



Parallelograms on the coordinate plane.

- distance, midpoint, and slope can be used to determine if a quadrilateral is a parallelogram

$$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

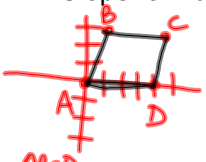
$$M\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$$

$$m=\frac{y_2-y_1}{x_2-x_1}$$

Determine whether a figure with the given vertices is a parallelogram. Use the indicated method.

A(0, 0) B(1, 3) C(5, 3) D(4, 0)

Slope formula



$\overline{BC}$ $m=\frac{3-3}{5-1}=0$

$\overline{AD}$ $m=\frac{0-0}{4-0}=0$

$\overline{BA}$ $m=\frac{3-0}{1-0}=3$

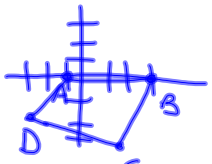
$\overline{CD}$ $m=\frac{3-0}{5-4}=3$

ABCD is a ▱ b/c it has 2 sets of // sides

Determine whether a figure with the given vertices is a parallelogram. Use the indicated method.

A(-1, 0) B(3, 0) C(2, -3) D(-3, -2)

Distance formula



$AB=\sqrt{(3--1)^2+(0-0)^2}=4$

$DC=\sqrt{(-3-2)^2+(-2--3)^2}=\sqrt{26}$

25 1

Not a ▱ b/c opp sides ≠

Determine whether a figure with the given vertices is a parallelogram. Use the indicated method.

A(-2, 4) B(-1, -1) C(3, -4) D(2, 1)

Midpoint formula (Check diagonals)

$\overline{AC}$ $M\left(\frac{-2+3}{2},\frac{4-4}{2}\right)$ $\left(\frac{1}{2},0\right)$

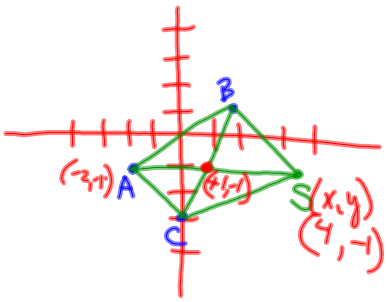
$\overline{BD}$ $M\left(\frac{-1+2}{2},\frac{-1+1}{2}\right)$ $\left(\frac{1}{2},0\right)$

ABCD is a ▱ b/c diagonals bisect each other

A parallelogram has the vertices A (-2, -1) B (2, 1) and C (0, -3). Find all possible coordinates of the 4th vertex.

BC $M\left(\frac{2+0}{2}, \frac{1+-3}{2}\right)$

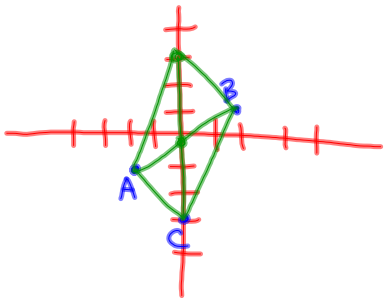
$(1, -1)$



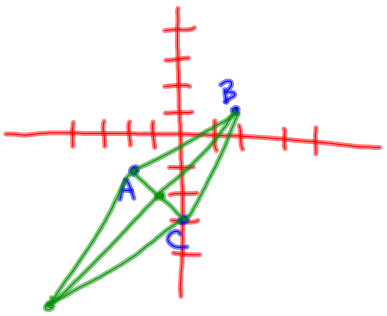
$\frac{-2+x}{2} = 1$ $\quad -2+x = 2$ $\quad x = 4$

$\frac{-1+y}{2} = -1$ $\quad -1+y = -2$ $\quad y = -1$

A parallelogram has the vertices A (-2, -1) B (2, 1) and C (0, -3). Find all possible coordinates of the 4th vertex.



A parallelogram has the vertices A (-2, -1) B (2, 1) and C (0, -3). Find all possible coordinates of the 4th vertex.



HW
p421-422
13-19, 22, 25, 28, 29